

REMARKS

In the Office Action, claims 1 and 22-40 are pending. Claims 1 and 22-40 are rejected under 35 U.S.C 103(a) as being unpatentable over Johansson, et al. (U.S. Patent No. 5,277,764), Andersson, et al. (U.S. Patent No. 5,607,552), or Keiser, et al. (U.S. Patent No. 6,486,216). This rejection is respectfully transversed.

The present invention relates to aqueous sols containing silica-based particles, wherein the sols have an S-value within the range of from 10% to 45%. In one claimed embodiment (e.g., claim 1), the sol also has a viscosity within the range of from 5 to 40 cP and a molar ratio of  $\text{SiO}_2:\text{M}_2\text{O}$  within the range of from 10:1 to 40:1, where M is an alkali metal or ammonium; and the silica-based particles have a specific surface area within the range of 550  $\text{m}^2/\text{g}$  to about 725  $\text{m}^2/\text{g}$ . In another claimed embodiment (e.g., claim 29), the sol has a viscosity within the range of from 5 to 40 cP and a silica content of at least 10% by weight; and the silica-based particles have a specific surface area within the range of 550  $\text{m}^2/\text{g}$  to about 725  $\text{m}^2/\text{g}$ . In a third claimed embodiment (e.g., claim 35), the sol has a viscosity within the range of from 7 to 25 cP, a silica content of at least 10% by weight, a molar ratio of  $\text{SiO}_2:\text{M}_2\text{O}$  within the range of from 10:1 to 40:1, where M is an alkali metal or ammonium, and a pH of at least 10.6.

Johansson relates to a process for the production of cellulose fiber containing products in sheet or web form from a suspension of cellulose containing fibers, and optional filler, which comprises forming and dewatering of the suspension on a wire and drying, whereby anionic inorganic particles and a cationic carbohydrate polymer are added to the suspension. The anionic particles can be silica-based particles, and Johansson generally discloses different sols of colloidal silica-based particles. However, Johansson is silent about the viscosities of the silica-based sols.

Andersson discloses an aqueous stable suspension of colloidal particles wherein the particles are both silica-based anionic particles and hydrated particles of clays and smectite type that are expandable in water, whereby the weight ratio of silica based particles to clay particles is within the range of from 20:1 to 1:10 and the dry content of the suspension is within the range of from 5% to 40% by weight. Andersson further generally discloses sols of colloidal

silica-based particles. However, Andersson is equally silent about the viscosities of the silica-based sols.

Keiser discloses stable aquasols comprising colloidal silica having a surface area of from about 700 m<sup>2</sup>/g to about 1100 m<sup>2</sup>/g and a S-value of from about 20 to about 50, wherein the colloidal silica is not surface treated and wherein the molar ratio of SiO<sub>2</sub>:Na<sub>2</sub>O in the colloidal silica is greater than about 13.0:1 and is less than about 17.0:1, and wherein the aquasols have a percent by weight of SiO<sub>2</sub> solids level of from about 7.00% to about 16.80%. However, Keiser is also silent about the viscosities of the aquasols.

In the pending office action, it is stated:

*“since viscosity is dependent on such factors as particle size and surface area, it is obvious that since the S-values and specific surface area of the above prior art sols are within the claimed range, the prior art obviously encompasses the claimed viscosity”.*

Applicants agree that viscosity is dependent on such factors as particle size and surface area. However, Applicants respectfully disagree with the position that the prior art obviously encompasses the claimed viscosity because the S-values and specific surface area of the cited prior art sols are within the claimed range. Applicants' position is supported by two §1.132 Declarations filed herewith.

In the Declaration of Dr. Marek Tokarz, co-inventor of the present application, Dr. Tokarz presents experimental data relating to aqueous sols containing silica-based particles and the evaluation of these sols by means of drainage and retention performance in papermaking. The aqueous sols tested encompass both prior art sols and sols according to the claims of the present invention.

Dr. Tokarz concludes that it is not a correct assumption that since the S-values and specific surface area of the prior art sols are within the claimed range, the prior art obviously encompasses the claimed viscosity. The test results presented demonstrate, *inter alia*, prior art sols of silica based particles having S-values and specific surface areas within the claimed range but having viscosities outside of the claimed range.

In the Declaration of Dr. Hans E. Johansson Vestin, co-inventor of the Johansson and Andersson patents cited in the office action, Dr. Johansson Vestin elaborates on parameters of aqueous sols containing silica-based particles. Dr. Johansson Vestin also concludes that it is not a correct assumption that since the S-values and specific surface area of the prior art sols are within the claimed range, the prior art obviously encompasses the claimed viscosity. Dr. Johansson Vestin further opines that viscosity depends on several parameters of an aqueous silica-based sol, not only S-values and specific surface area. As a consequence, according to Dr. Johansson Vestin, it is certainly possible that the aqueous sol containing silica-based particles according to the present invention has a viscosity that is different, even to a large extent from the viscosity of prior art sols, even if the S-values and specific surface areas are within the same range.

Finally, Dr. Johansson Vestin also opines that the Johansson, Andersson and Keiser references do not teach, suggest or disclose, either explicitly or implicitly, the invention claimed in the present application.

Thus, for the reasoning set forth above, Applicants submit that the present invention is non-obvious over the cited prior art. The Applicants respectfully request that the Examiner reconsider the rejection and find the claims in condition for immediate allowance.

Respectfully submitted,

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